

# HUNTING AND MANAGEMENT OF WHITE-TAILED DEER IN MISSOURI



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**T**he white-tailed deer is one of Missouri's most valuable wildlife resources. Each year hunters take nearly four million trips to the field, pursuing the whitetail, contributing hundreds of millions of dollars to the economy. Public viewing of deer attracts thousands of visitors to our state's public lands annually. A survey of urban and rural Missouri citizens revealed that of all animals outside a zoo, people most prefer to see the white-tailed deer. It also is a favorite with children. The whitetail was selected as our state mammal by vote of school-age children.

On the down side, deer cause thousands of vehicle accidents on our roadways annually and feed on agricultural and household plantings throughout the

state. It is not surprising that Missourians have strong feelings toward whitetails, mostly positive, but some negative. As a steward of this important wildlife resource, the Missouri Department of Conservation is sensitive to these attitudes.

The Department's goal is to maintain deer numbers at levels that serve the best interest of the Missouri public. This requires knowledge of whitetail biology. Equally important, however, is commitment and cooperation from Missouri citizens who serve both as the advisory board that guides our management and the tool with which we regulate deer numbers. The landowner is the key to this process because most deer management in Missouri takes place on private properties.



*The white-tailed deer can be different things for different Missourians. For wildlife enthusiasts, it is natural beauty and grace; for motorists, a collision threat; for farmers, a potential crop damager; for recreational hunters, a worthy adversary. But for all Missourians, the whitetail is an important part of the natural resource heritage under our stewardship.*



# HISTORY

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The history of white-tailed deer in Missouri shows positive and negative influences humans can have on wildlife. During presettlement times, the whitetail was abundant in Missouri, especially in the more fertile and diverse habitats of northern Missouri. The influx of European settlers to Missouri during the last half of the 19th century coincided with a rapid decline in the deer population. Unrestricted market hunting and habitat destruction, such as cutting, burning, farming and grazing forest lands, contributed most to this decline.

Token laws restricting the killing of deer were passed in the late 1800s and early 1900s, but they went largely unenforced. In 1925, the state's deer herd was estimated to be only around 400. In response to these findings, the Missouri State Legislature declared deer season closed and made the first substantial effort to enforce its regulation. At the same time, deer brought to Missouri from Michigan were released onto five refuges in the Ozarks. In 1931, deer season reopened but resulted in a small harvest, which indicated a low population that was stable or declining.

Only when the first Conservation Commission formed in 1937 did significant efforts to restore the whitetail begin to succeed. The Commission closed deer hunting season from 1938 to 1943. During this closure, additional deer were stocked from Wisconsin, Michigan, Minnesota and from existing refuges within the state. Enforcement of the *Wildlife Code of Missouri* by professionally trained conservation agents helped deter poaching. By 1944, the statewide deer population soared to 15,000, and Missouri held its first deer season since the recovery effort had begun.

Missouri's deer management program has come a long way since 1944. That year, 7,557 hunters took 583 deer during a two-day, bucks-only season in 20 southern Missouri counties. In recent years, nearly 500,000 gun and bow hunters typically harvest around 300,000 deer annually during statewide seasons. Missourians can take pride in the widespread restoration of this major wildlife species.

Successful deer management requires flexibility in response to changing conditions. The white-tailed deer is strongly affected by hunter pressure; populations can be underharvested or overharvested. The penalties for either are great. With underharvest, crop damage and deer-vehicle accidents may increase. Overharvest



means several years of slow recovery, especially in Ozark habitat where forage quality is lower. Successful management is maintaining the delicate harvest balance.

Many tools are necessary to accomplish this balancing act. In the 1950s and early 1960s, Missouri had short any-deer seasons. As hunting pressure increased, this type of management became outdated because harvest of does could not be controlled. Since then, deer management has gradually evolved from a quota system based on deer management units to a county-based system where quotas are no longer used. Today harvest and deer populations are managed by allowing various numbers of archery and firearms antlerless permits to be used in each county.

The firearms deer hunting season is now composed of different portions that provide the varied hunting opportunities Missourians enjoy. The current season

structure accommodates different hunting methods and styles, and also specific user groups. Consequently, it satisfies the great demand for deer hunting without harming the resource, and also provides multiple weekends of hunting for those who cannot hunt on weekdays.

## BIOLOGY

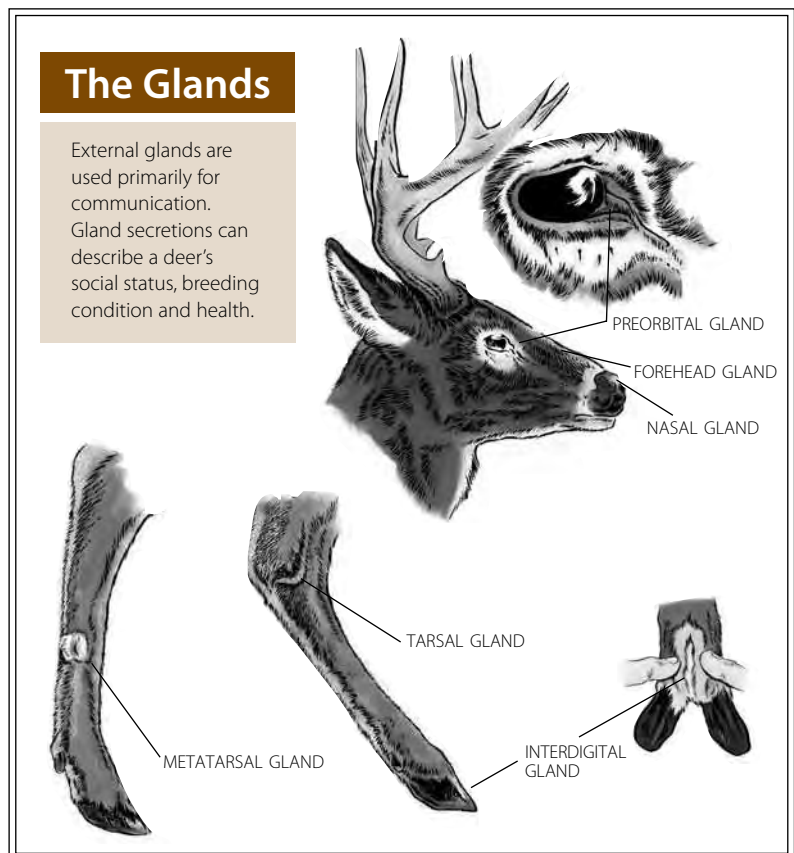
White-tailed deer are ungulates, or hoofed mammals, belonging to the family Cervidae. Characteristics distinguishing this group from other hoofed mammals are forked antlers, a four-part stomach and the absence of a gall bladder. The whitetail is the only remaining native ungulate still thriving in Missouri. Ancestors of our modern deer actually had five toes. Through evolution the first toe disappeared, the second and fifth toes became dew claws, and the third and fourth toes enlarged to form hooves. As a result, deer actually walk on their toes or, more precisely, on their toenails. Like our fingernails and toenails, hooves are composed of keratin. As whitetails grow older, their hooves become wider. Experienced trackers can tell yearling deer from adults based on this characteristic.

A whitetail's coat and color tend to change throughout the year. During the summer months, deer are reddish-brown, and their coats are rather thin—less than a quarter-inch thick. By August or September they shed their summer pelage, or coat, and replace it with a thick, brown-gray winter coat sometimes more than 1-inch thick. The winter pelage is made up of both a short underfur and outside guard hairs. This dense layer of hair may weigh up to 3 pounds. The molt/shed cycle begins again in April when deer start to grow their summer coats. This almost continual shedding and regrowth requires substantial amounts of protein and energy.

Occasionally, deer have either all white, dark brown to black or piebald coats. White deer are usually albinos. This genetic trait is sometimes prevalent in one area, but it is not common anywhere. Deer that have patches of both white and brown hair are called piebald deer. These animals may have a patchwork as extensive as that of a pinto horse, or it may be

less pronounced. The rarest color variation is black or melanistic. It is caused by an excess of a dark pigment called melanin. Dark brown or black, albino and piebald deer are legal game in Missouri.

Whitetails have as many as seven glands that are used primarily for communication. Gland secretions can describe a deer's social status, breeding condition and health. The most recognized glands are the tarsal and metatarsal glands, located on a deer's hind leg. The tarsal gland, located on the leg's inner surface, serves to identify individuals and their social status. The metatarsal gland, found lower on the leg and on the outside, may help in advertising that there is danger in an area but its function, if any, is unclear. Interdigital glands, located between the hooves, probably leave scent trails that may express dominance. Pre-orbital glands function as tear glands and may relay sex and social hierarchy when rubbed on branches. Forehead glands likely are the source of scent left on rubs and overhanging branches that serves in communication during the breeding season. Preputial glands located inside the penial sheath have recently been discovered and also may serve in deer communication.





*In the spring, whitetails seek out protein-rich foods, which promote growth spurts and weight gain.*



## Antlers and antler growth

Whitetails are probably best known and sought after for their antlers. Sometimes incorrectly referred to as horns, deer antlers are cast and regrown annually. Horns, on the other hand, grow continually much like hooves. Another difference between horns and antlers is that horns, like hooves, are composed of keratin, whereas antlers are composed of bone. The actual composition of antlers depends upon their stage of growth. Growing antlers are 80 percent protein and 20 percent ash. Hardened antlers are roughly 63 percent ash, 22 percent calcium, 11 percent phosphorus and 4 percent organic matter. Antlers are most dense on young deer and tend to become more porous as the animals grow older.

The phrase, “the head grows according to the pasture,” is probably more accurate when stated, “the body grows according to the pasture.” Antler growth requires a substantial amount of protein, energy and minerals, yet body growth always takes precedence. This is true especially for young deer because they are still putting energy into body growth.

Measuring specific nutritional and mineral effects on wild deer antler growth is difficult because of the animals’ large home range and varied diet. A number

of studies on penned deer have found relationships between nutrition and antler growth in young deer. Whitetail fawns fed a ration containing less than 9.5 percent protein developed smaller racks, weighed less and cast their antlers earlier than fawns fed 16 percent protein rations.

Although spring nutrition is important for body and antler growth, whitetails possess adaptations that enable them to prosper in areas with mineral deficiencies. For example, deer deposit minerals in their skeletons throughout the year. Then, during antler growth, they mobilize these minerals to the growing antlers. A second adaptation is their ability to change absorption rates of minerals in their stomach. When using large amounts of minerals for antler growth, deer siphon more minerals from their diet. Deer rely on plants for these minerals, and they select plants offering the highest mineral concentrations.

Protein and minerals play an important role in deer growth and antler development. Yet under normal weather conditions in decent habitat, deer are able to grow to their potential without supplementation. A study that took place in an area with markedly poor soils found no significant difference between body

weight or antler size in two populations of wild deer. One group had unlimited access to mineral blocks, and the other did not. In another study, deer with access to food plots were not heavier nor did they have larger antlers than deer without access to food plots.

Most studies that examine the effects of genetics on antler growth are studies of penned deer. Whether these findings may be extrapolated to wild populations remains in question. One theory suggests that spike bucks—bucks, usually yearlings, with non-branched antlers—are genetically inferior. Another contends that many of these spike bucks are late-born fawns whose antler development is retarded but will eventually catch up with other bucks.

No doubt if we take 100 bucks and feed them the same rations until they reach 4½ years of age, antler development will vary among these deer. Much of this variance probably is caused by genetics. Genes and nutrition aside, however, a 3- to 7-year-old deer in Missouri will have a “braggin’ sized” rack because Missouri has good deer habitat.

## Deer weights

Deer weights tend to vary by region within a state. In Missouri, on average deer are heavier and sport better racks in the northern half of the state. Latitude may play a role, but the range quality likely plays a greater role. Superior soils and abundant agriculture in northern Missouri offer better nutrition. The largest recorded deer taken in Missouri weighed 407 (live weight) pounds and was killed in 1979 in Davies County.

Average Dressed Carcass Weights (in Pounds)						
REGION	FEMALE			MALE		
	FAWNS	YEARLINGS	ADULTS	FAWNS	YEARLINGS	ADULTS
Glaciated Plains	67.6	100.7	111.7	72.1	123.5	154.8
Osage Plains	48.0	77.9	87.4	54.0	93.9	128.2
Ozark Border	51.7	84.8	92.6	58.2	101.0	132.7
Ozarks	47.0	76.9	86.5	53.2	86.7	125.2

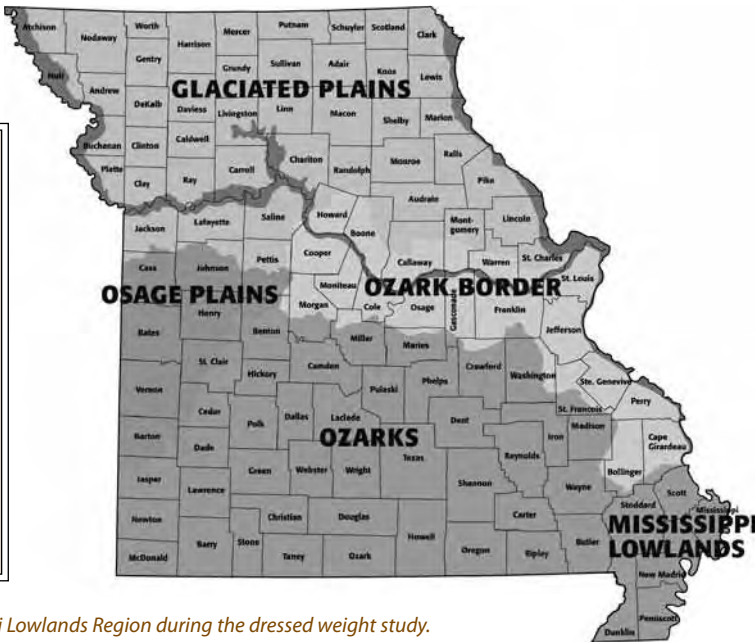
Note: Due to lack of good habitat, few deer were harvested from the Mississippi Lowlands Region during the dressed weight study.

## The seasons

Spring is the time of plenty for deer. New succulent plants send out tender shoots. Food is abundant even in areas that do not normally provide deer with nutritious food. At this time of year, the woods become a huge salad bar, and deer are able to sample different flowers and plants as they choose. Among the spring favorites in Missouri are wild lettuce, grape vines, trumpet vine, cinquefoil, sweet clover, violets and spring beauty. Most plants offer peak nutrition during spring, and whitetails respond with growth spurts and weight gain. Males channel energy to their antlers and regain the weight lost during last year’s breeding activities. Females transfer energy to unborn fawns, which now undergo rapid growth.

Almost all Missouri does 1½ years old or older breed and produce fawns each year. In addition, 30 to 40 percent of fawns that are less than ½ year old breed and produce offspring by the time they are 1 year old. The number of fawns that are born and survive annually is dependant upon a number of factors including the age and nutrition of the mother, deer density in the area and winter stress. Birthrates vary from region to region as these factors change.

The pregnancy rate of whitetails in Missouri was measured by examining the number of fetuses in road-killed does. Pregnancy rates for deer 2½ years old and older were nearly equal, but rates for younger deer were markedly lower. Adults had more



offspring per doe than yearlings, who had more than the youngest group. In Missouri, most adult and yearling does have twins each year. The folk tale that old does tend to be barren is a myth. Researchers documented fetuses in does over 15 years of age. In fact, some researchers suggest that older does are more successful mothers because they are experienced and have the best territories.

Peak fawning takes place in late May and June and begins when pregnant does isolate themselves and drive other deer from their fawning areas. Adult deer use the same areas each year. The establishment of fawning territories is thought to limit social stress and help distribute populations evenly. Territories also may prevent newborn fawns from imprinting on deer other than their mothers.

The first weeks of life for newborn fawns are precarious. Young fawns are vulnerable to a variety of predators, diseases, parasites and human-caused mortality. In Missouri, the major natural predators are coyotes, dogs and bobcats. To reduce exposure to predators, fawns spend most of their time bedded and hidden in heavy cover, such as hay fields, grown pastures and old fields. Studies using radio transmitters suggest fawns are active less than one-fifth of a 24-hour day.

Both the doe and its offspring spend most of their time in a 10- to 20-acre area these first weeks. Does visit their fawns two to four times a day to nurse and groom them. Fawns move to a new bed site after each feeding and grooming session, but siblings generally do not bed together. During this time, does sometimes physically defend their offspring from predators. It is also during this period that people find what they believe are “abandoned” fawns. In most cases, its mother is close by. Bedded fawns should be left alone.

Following its first month, the fawn increases nursing and activity periods. After four to six weeks, a doe may visit her fawn as often as five or six times per day. Fawns begin eating vegetation and ruminating at two weeks, although they cannot digest plant nutrients until five weeks. Fawns become more social, are more likely to be seen with their siblings or mother and increase their activity to levels similar to adult does. After 10 weeks, fawns eat grasses and forbs and are functional ruminants.

Young does typically establish fawning territories next to their mother’s, but sometimes they disperse and

establish in a new area. Missouri deer studies suggest does travel widely during spring then, before giving birth, reduce their movements dramatically.

It is much more common for 1-year-old bucks to disperse. In a northern Missouri study that used radio transmitters, 77 percent of buck fawns roamed more than 8 miles. Dispersal by young bucks and does is especially pronounced in areas with high deer densities. Dispersing deer tend to have higher mortality rates, but they may be more likely to find vacant good habitat. This dispersal also might reduce the amount of inbreeding.

## ***Summer***

During summer, does and bucks are segregated, sedentary and spend most of their active time eating. Does and fawns travel and feed together throughout the summer. Sometimes fawns from the previous year travel with this year’s doe/fawn groups. Does with fawns may spend 70 percent of their time eating to meet their high nutritional requirements. They often seek shrubby, thick cover because it offers better hiding and higher quality forage.

Bucks often congregate in bachelor groups composed of neighboring bucks. Males typically use open habitats, such as mature hardwoods, fields and poorly stocked forests. Thus, they often are found in different habitats than family groups of does and fawns. Some deer researchers suggest males prefer open areas so they can keep track of their position in the social hierarchy and to keep from damaging their antlers while feeding. Others theorize that the males’ nutritional requirements are lower per pound of body weight or that their large rumens allow them to consume more food and gather sufficient nutrition from poorer ranges.

Activity levels in deer are proportional to their nutritional needs. Larger bucks are reported to be more active than smaller bucks during summer. Females are more active than males. Nonetheless, both sexes tend to have smaller home ranges during summer and use wooded cover during daytime periods and open areas at night.

## ***Fall and Winter***

Fall is a frenzied time of year for whitetails. Does and fawns continue to travel in groups, but now fawns are



totally weaned and does feed aggressively to recover from the stresses associated with raising them. During fall, deer eat items rich in starch and carbohydrates. In oak-hickory forests, this means acorns and soft mast, such as persimmons. Deer also graze on cool season grasses and legumes, which are undergoing a resurgence of growth with cooler fall temperatures and rain.

Yearling bucks that have not dispersed the previous spring may do so in fall. According to studies, this group represents less than 20 percent of yearling bucks in Missouri. Adult and yearling buck bachelor groups break up, and bucks begin to shed their antler velvet and rub trees. An increased production of testosterone, triggered by decreasing day length, brings on the changes in buck behavior and the hardening of antlers. Rutting behavior and activity varies with the age and experience of the bucks and the sex and age ratios of the local deer herd.

Sparring matches are common prior to the break up of bachelor groups, especially among younger animals. Yearling (1½-year-old) and 2½-year-old bucks spar to size each other up without injuring themselves. Older bucks with previously established dominance tend not to participate in much pre-rut sparring.

About the time bucks decrease their sparring

activities, they increase antler rubbing. Most rubs are thought to be signposts made by bucks to advertise their presence. Rubs provide visual cues and scents that inform other deer about the rub maker. Although no one knows for sure, these rubs probably relay information about social status. The number of rubs a deer makes seems to vary among individuals, but studies of penned deer have shown that adults rub more often than yearlings.

The pattern and frequency of buck sign in an area often reflect the age structure and sex ratios of the resident deer herd. Areas with mature adult bucks have more buck sign, and these areas show signs of rubbing and scraping activities earlier than areas with predominantly yearling bucks.

Scrapes also are signposts made by bucks. They probably are used to attract or keep track of breeding females and to advertise the presence of the maker. When making a scrape, a deer paws the ground and urinates on the disturbed soil. Most scrapes are made near deer travel routes under low tree branches that typically are nibbled on and marked with a scent gland from the deer's forehead. Adult bucks make about twice as many scrapes as yearlings. Although not common,



*Occasionally during the breeding season, two evenly matched bucks battle for dominance. These serious confrontations are quite different from the gentle sparring typical of younger bucks before the breeding season.*

buck fawns and does have been observed freshening scrapes.

As the rut progresses, bucks become driven to find estrous does—those that are ready to breed. The period just prior to peak breeding probably offers bow hunters the best hunting of the season because bucks constantly move and search for does in heat. Rutting bucks spend more time searching for and tending to does than eating during breeding season and sometimes lose considerable weight. Bucks typically visit the various doe family units in their home range checking for estrous does.

Prior to breeding, does also increase activity levels, thus increasing the likelihood of finding a buck and being bred. Does allow a buck to breed only during the 24-hour-period when they are in peak estrous. Does that are not bred cycle again about 28 days later and may be bred in subsequent cycles. In Missouri, most adult does are bred the second and third weeks of November. Doe fawns are bred about a month later because they cycle later than adults.

Although a buck that is at least 2½ years old will generally do more breeding than a yearling buck that is 1½ years old, recent evidence suggests that even in a lightly hunted population, yearling bucks breed some of the does. The proportion of does bred by yearling bucks could be considerable in heavily hunted areas. Also, multiple paternity, where twin or triplet fawns produced by a doe have different fathers, is fairly common, ranging from 20 to 25 percent, according to studies.

Biologists have voiced concerns that not all does are bred in populations with heavily exploited bucks. This is not the case for yearling and adult does in Missouri. During a Conservation Department reproductive study, more than 90 percent of examined does were pregnant, and most breeding occurred over a fairly short time period.

During the whitetail's courtship, bucks trail and chase does to test their receptivity to breeding. Does aid this process by urinating frequently, which allows trailing bucks to determine their stage of estrous by smelling and tasting the urine. When a buck finds a receptive doe, he remains close by, and the two mate several times. Using radio telemetry during deer studies in north Missouri, researchers determined that mating pairs sometimes spent more than 12 hours together.

As breeding activities wind down, testosterone production decreases in males, and they, in turn, begin

to shed their antlers. Some studies suggest that antler shedding also is tied to nutrition because deer living on better ranges tend to carry antlers longer than those on poorer ranges. Young deer typically shed antlers earlier than adults. The older deer, who are actively breeding, shed their antlers after there are no longer does coming into estrous.

During the rut, bucks are struck by vehicles more frequently than at other times of the year and are more vulnerable to hunting. The rut leaves most bucks in poor physical condition. Besides weight losses of up to 20 percent, bucks also may suffer from battle scars and exhaustion. They often enter winter in poorer condition than the rest of the herd.

Winter can be a very difficult time of year for deer, especially in the northern states. Cold weather and reduced food availability force deer to change their habits to conserve energy and survive. Although Missouri winters are not severe, our whitetails display some of the same behaviors as their northern counterparts. These northern deer spend the winter in a sheltered area, then return to their summer range the following spring. A number of radio-tagged deer in Missouri made movements of up to 10 miles each winter then moved back to their summer ranges each spring.

Extended family members often reunite during winter. Most family units winter in the same areas each year, but deer concentrate in new areas if food is abundant. Typically, bucks and does are still segregated. Does and their offspring from several generations often form large groups while males reunite with members of their bachelor group or travel alone.

Deer reduce activity during the winter months. Studies have documented activity changes of up to 50 percent. One study found deer were active 68 percent of the time in October but only 37 percent of the time in February. Their metabolic rate slows down as their activity rate declines, and they require less energy.

During the winter months, deer readily eat foods that are rich in carbohydrates, such as acorns and waste grain. Deer also browse on young trees and shrubs—staple foods for deer in areas lacking agricultural crops and a supplement for all deer during the winter months. The degree to which deer browse certain shrub and tree species sometimes is used as an indicator of deer population levels and winter severity. Some

species of sumac and dogwood, for example, are readily consumed by deer. Red cedar and hickory are considered starvation foods and are only eaten when populations are high.

## Diet

Because whitetails are ruminants, they eat a wide variety of foods. Their four-part compound stomach enables them to break down woody browse and herbage, but they cannot digest low-quality forage, such as grass, as efficiently as cattle.

Deer are selective feeders and seek out preferred plant species. Deer have been documented eating more than 600 different types of plants. Deer in the Ozark region of Missouri live in chiefly wooded areas and rely on natural forage, such as grape vines, green briar, Virginia creeper, oak leaves, pussy toes, clovers and prickly lettuce. During spring and summer, deer eat perennial plants more than annuals.

Studies in agricultural areas of Missouri, Iowa and Ohio indicate cultivated crops comprised 41 percent, 56 percent and 48 percent respectively of deer diet by volume. Most researchers found wild browse, fruits

and seeds also are major food items. Deer prefer corn, soybeans and hay from the variety of agricultural crops. Oak mast and leaves, corralberry and various forbs are important wild browse food for deer in agricultural areas. These differences in plant use and regional food habit studies are likely a reflection of plant availability. Agricultural crops may be preferred when they are available, but deer still rely on early successional plants and oak mast. Ask your local conservation agent or private land conservationist for details on which species to plant or encourage to attract deer to your land.

## MANAGING LAND FOR DEER

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The effect of food plots, agricultural plantings, forest management and management of natural vegetation on deer in Missouri is open to speculation. Because deer populations in our state are under the land's carrying capacity—the number of deer the habitat can support—generally deer are not limited by food scarcity. Missouri's mild winters, naturally diverse habitats and good mixture of crop ground and woody cover provide deer ideal conditions.

However, the larger body sizes, better antler growth and higher reproductive rates of north Missouri deer, where soils are fertile and intensive agriculture predominates, suggest an abundant, high-quality food source may be important for producing these desirable characteristics. In addition, studies of penned deer have found positive correlations between soil fertility (mostly calcium and phosphorus levels) and increased antler growth, productivity and body weights. It seems apparent that well-nourished deer are more likely to reach their biological potentials for reproduction, body size and antler growth.

But will one or two quarter-acre food plots surrounded by 1,000 acres of the poorest woods in Missouri make a difference? Probably not. But 25 well-placed one- to two-acre plots could benefit deer under these conditions, especially if coupled with proper forest management.

Besides the potential benefits for deer, land management gives deer enthusiasts a better understanding of deer habits. Proper management makes property more attractive to deer, which increases





the time they spend on that piece of land. A patch of lush clover or wheat is a dynamite spot to harvest a deer early in archery season. Later in the season, grain such as milo, and heavy cover such as a 6-year-old clearcut, attract deer because they offer both high energy carbohydrates and cover. During spring, grown-up pastures provide concealment for newborn fawns and an abundance of nutritious forbs. Bucks seem to prefer openings and open woods during summer when they are growing antlers and visually sorting out their dominance hierarchy. Certain songbirds, quail, rabbits and other edge species attracted to food plots also may benefit from deer habitat management.

## Managing deer populations

A question often asked by landowners is, “Can I effectively manage deer on my property?” The hunting season framework affords the opportunity for landowners to achieve desirable harvests on any property. Yet landowners’ ability to control deer numbers on their property depends upon the land’s size, shape and quality of habitat. Habitat quality and hunting pressure on surrounding properties also are important factors to consider.

The amount of land owned by one person decides how much of a role outside factors may play. As described earlier, deer move over large areas. As a result, the ability to manage deer increases

proportionally with the number of acres owned. For example, landowners with 10 acres will have less control over deer on their property than landowners with 1,000 acres.

The amount of hunting or other activity on adjacent properties also is an influencing factor. Light or no hunting pressure on surrounding land may make it easier for a person to produce large bucks or increase deer densities. On the other hand, people trying to reduce deer numbers on their property may find it difficult if hunter access is limited on surrounding properties.

The physical shape of the property may affect how often deer move onto adjacent land. A long linear shape, as opposed to a more compact shape, may have more individual deer on the area, but these animals may spend less time there. When surrounded by heavily hunted ground, deer that live on a linear holding would spend more time off the property and, therefore, would be exposed to greater hunting pressure.

Quality of deer habitat and primary sources of food control how much time is spent on an area because deer shift movement patterns according to food distribution. In a year with a good acorn crop, deer may select oak-hickory forests for foraging in the fall instead of agricultural fields. On the other hand, deer may favor agricultural fields at other times of the year and also in years of poor acorn production.



*In Missouri, most adult does have twin fawns; triplets are less common. Although the mortality rate for fawns can be 40 to 50 percent, deer have a 95 percent survival rate without hunting once they reach six months of age.*

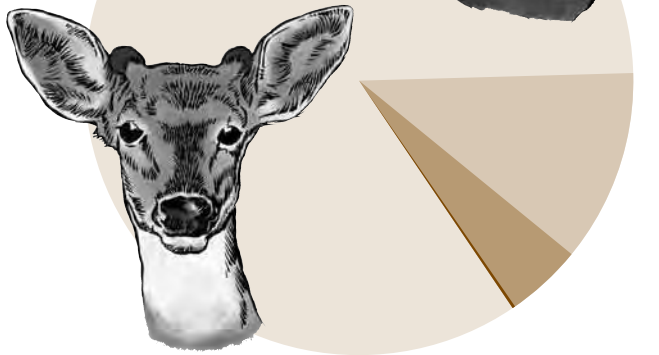
## Population principles

Whether a deer population increases, decreases or remains stable depends upon the balance between reproduction and mortality. Deer reproductive rates in Missouri are high, typical of those throughout much of the lower Midwest. Studies in several parts of Missouri determined deer mortality by monitoring free-ranging deer fitted with radio transmitters. These studies show that fawn mortality during the first six months of life may exceed 40 percent. Predation and farming activities are the primary causes of mortality in fawns less than 2 months of age.

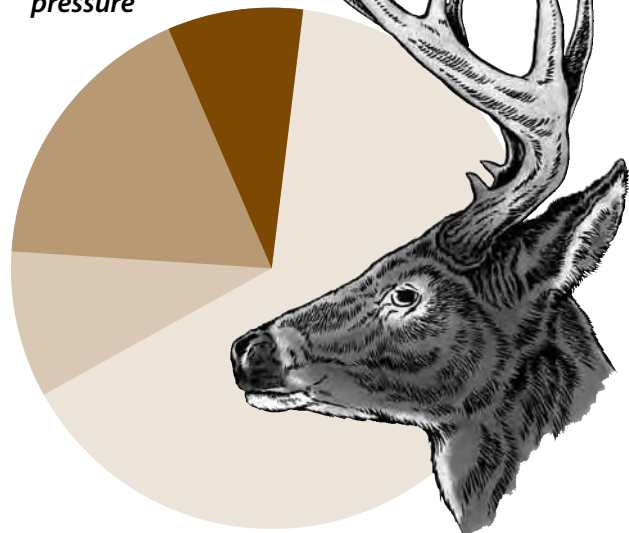
## Age Class vs. Hunting Pressure

Figure 9. Population modeling shows the dramatic difference hunting pressure has on the number of antlered deer in an area. The key to management for larger bucks is simply to allow males in younger age classes to survive to older age classes.

*Deer population under high buck harvest pressure*



*Deer population under low buck harvest pressure*



### Key

- |  |  |
|--|--|
| Antlerless deer                          | Antlered bucks between 2 1/2 and 4 1/2 years old |
| Antlered bucks less than 2 1/2 years old | Antlered bucks 4 1/2 years old and older         |

Without hunting, the annual mortality of 6-month-old and older deer is usually less than 5 percent. An exception to this occurs during hemorrhagic disease outbreaks, which take place periodically in Missouri and kill up to 20 percent of the deer in some areas. Mortality also may be different in urban areas where collisions with vehicles becomes the largest cause of death.

Hunting is the leading cause of deer mortality in most of rural Missouri. Each year hunters take 40 to 70 percent of the antlered bucks and up to 25 percent of the does. It is apparent, therefore, that hunting is the primary factor governing deer abundance.

Hunting mortality of does is the most important factor determining whether a population increases, decreases or remains stable. One male can mate with many females, so bucks can remain at much lower numbers than does without affecting reproductive rates. This can be shown by simulating a deer population under various buck and doe harvest rates. Harvests of 10 percent and 40 percent of the antlered deer from a herd

has little effect on the overall population growth. Similar harvests of does, however, affect population growth.

If hunting mortality is eliminated, and all other mortality and reproductive factors remain the same, a deer population increases rapidly, nearly quadrupling in size in just 10 years. Growth at this rate, however, could not continue indefinitely. As the deer population increases, it eventually reaches and exceeds the land's carrying capacity—the number of animals a habitat can support on a sustained basis.

The Conservation Department's statewide deer management program attempts to maintain deer populations at levels high enough to provide adequate opportunity for hunters and people who enjoy watching deer. Conversely, numbers must be low enough to minimize crop destruction and deer/vehicle accidents. Of course, people do not always agree about how many deer are too many or not enough.

The Conservation Department monitors the attitudes of the two groups most affected by deer

abundance: farmers and hunters. Periodic mail surveys serve as the basis for setting deer population goals, along with information supplied by Conservation Department field staff.

## **Specialized deer management**

Considerable interest in managing land for mature bucks has developed in recent years. Two tenets dominate popular and management-oriented literature: quality and trophy management. The concept of quality deer management began in the southern United States. Its primary objective is to manage deer populations and habitat to ensure a quality hunting experience. Although deer in older age classes is one goal, other factors are considered.

Trophy management is more restrictive. Its primary emphasis is producing a buck with the largest possible rack. This requires intense management and strict control over harvests. It is not practical in most situations in Missouri.

A common concern expressed by deer hunters is a lack of bucks with well-developed antlers. Often the hunters believe that the deer lack adequate nutrition or have poor genetics. The real problem, however, is that most of the bucks they see are 1½ years of age. In some areas, bucks simply do not live beyond their first set of antlers because of heavy hunting pressure. Although genetic and nutritional factors can affect antler size, the majority of deer in Missouri that reach 3½ to 4½ years of age are trophies to most hunters. The key to management for larger bucks is simply to allow males in younger age classes to survive to older age classes.

Historically, antlered buck harvest has not been regulated, other than through bag limits, because buck harvest has little influence on total population levels. Under this management scheme, few bucks survived to older age classes. More recently, an increasing number of hunters are becoming more selective in what buck they will harvest, allowing an increasing number of young bucks to survive. The Conservation Department also has implemented regulation changes in an attempt to shift harvest pressure from bucks to does. Increasingly liberal antlerless deer bag limits have increased the proportion of the harvest that is made up of antlerless deer and, to some extent, reduced pressure on bucks. Other regulations that are intended to improve management, such as an antler restriction,

have reduced harvest of antlered deer and increased the number of bucks in older age classes.

Managers can improve the age structure of bucks in their area by not shooting young bucks during the hunting seasons. This may seem too simplistic, but deer survival is high when they are not hunted. Chances are good that a buck will survive if not taken during the hunting season and, in so doing, will grow bigger antlers the following year.

Hypothetical populations in which buck harvest is varied illustrates this the best. Sex and age ratios differ considerably depending upon the percentage of bucks harvested. When 10 percent of antlered bucks are harvested, 50 percent of the antlered bucks are between 2½ and 4½ years old, and 24 percent are 4½ years old and older.

In contrast, populations where bucks are highly exploited, only 27 percent of the antlered bucks are between 2½ and 4½ years old and 1 percent are 4½ years old and older. Antlered bucks would make up 35 percent of the total population in the low buck-exploited population compared with 16 percent in the high buck-exploited population.

Another way to restrict harvest is to take bucks with a minimum number of antler points. This allows more bucks to survive to the 2½-year-old age class. However, the number of points and deer age do not always correlate. Hunters may take yearlings with many points that should be protected. In contrast, hunters may pass up some older, larger deer with well-developed antlers but too few points to qualify for harvest.

Controversy currently exists over whether spike bucks should be culled. In Missouri though, most bucks that reach 4½ years of age will be trophies to most hunters. Given most hunter expectations and the inability to control harvests and dispersals on small land holdings in Missouri, the best strategy is to pass up these young bucks during the hunting seasons. The result usually will be the production of a quality animal several years down the road.

## **Record keeping**

Assessing the success of a deer management program is an important part of every management effort. This can be as simple as keeping track of the number of deer observed and taken during the deer hunting seasons each year to more scientific efforts, such as aerial census



of deer. Most hunters prefer the former, but those whose primary goal for the land is deer management may choose a more careful evaluation method.

Simple records carefully collected over a period of years can tell a lot about the status of the deer population. Most often hunters take these records during the deer hunting seasons when they spend the most time in the woods. Diaries of hunting trips (see form on page 32) not only can be rewarding historical accounts of hunts and observations but also can provide useful information about the deer population. Population indices, such as the number of deer sighted by sex and age per hour, may be determined from this type of information.

Deer sightings per hour are used by some state conservation agencies as a population measurement on public lands. Many biologists believe deer sighting indices are better able to track population changes than track or spotlight counts. Population indices become more meaningful over time and are not intended to produce complete counts; they show general trends in sex and age ratios and population changes. The key is to

record this information consistently from year to year. Annual records of harvested deer, their sex, age, weight, antler beam circumference and date taken also may be useful (see form on page 33). Records may provide information on the herd structure and condition that can be used to gauge the success of a management effort.

Census, or an actual count of deer, is much more expensive than those methods listed above and will not be a practical option for most deer managers. An aerial census with a helicopter over snow-covered ground currently is the most accurate way to count deer. Unfortunately, necessary conditions, such as adequate snowcover, do not consistently occur in Missouri.

Infrared scanners, which detect body heat and do not require snow cover, have shown some promise for counting deer. Other methods include fecal pellet group counts, spotlight surveys and track surveys. These methods are of questionable accuracy if actual deer population estimates are required. They may be of more value as an index to population trends than for counting deer.



*A pregnant doe feeds on a lush stand of red and ladino clover.*

# DEER HUNTING IN MISSOURI

All Missouri counties were opened to the hunting of bucks in 1959. In 2002, the buck-only tag was eliminated and a deer of either sex has been allowed in all counties since then with no limit on the number of hunters who can obtain these permits.

Missouri offers a wide range of hunting conditions. The Ozark region in southern Missouri has large areas of solid timber. As much as 85 percent of some counties are wooded. The central counties have cultivated land mixed with woods in about a 50:50 ratio. The prairie region in northern and western Missouri is mainly agricultural land with woody cover confined to woodlots or along streams.

## Finding a place to hunt

Most deer hunting in Missouri is done on privately owned land. Most landowners still permit free hunting, but there is a growing tendency to charge for hunting privileges, either by the day or the season. Often, farmers lease their entire holdings to a group of hunters for the season. Remember, always obtain permission before entering private land.

The U.S. Forest Service owns about 1.5 million acres in the Missouri Ozarks, and this land is open to public hunting. Maps are available from the U.S. Forest Service, 401 Fairgrounds Rd., Rolla, MO 65401. The Conservation Department manages more than 600,000 acres that also are open to hunting. Maps of conservation areas are available from the Department of Conservation, P.O. Box 180, Jefferson City, MO 65102-0180, and also at [www.missouriconservation.org/atlas](http://www.missouriconservation.org/atlas).

## Scouting

No matter where you choose to hunt, you should become as familiar with the area as you are with your own backyard. Your chance for success in a familiar area, even though it may have fewer deer, is greater than in an area that is strange to you. Thorough scouting prior to the hunting season will greatly increase your chances of success.

Look for deer tracks, droppings, signs of browsing on plants, buck scrapes along

the edge of forest clearings and antler rubs on small trees. Scouting may be done in advance of the season, however, remember that deer may change their location and movements as the acorns begin to drop and the breeding season begins.

A good map is essential to scouting any area. Topographic maps show the location of ridges, hollows, streams, and other landmarks which will help you become familiar with a new area. Not only will they help you plan your hunt, but they also may keep you from getting lost. Experienced hunters who are wise to the habits of deer can pick out likely spots for a stand from a topographic map. Topographic maps may be purchased from the Missouri Department of Natural Resources, Division of Geology and Land Survey, ATTN: Maps and Publications, P.O. Box 250, Rolla, MO 65402, (573) 368-2125, [www.dnr.mo.gov/geology/adm/publications/topoquads](http://www.dnr.mo.gov/geology/adm/publications/topoquads).

Once you have decided on a place to hunt, stay with it. There must be deer in the area or you wouldn't have picked it in the first place. The longer you hunt in the same place and the more you learn about the area and the habits of deer, the better your chance of success. As an example of how the wily whitetail can avoid the hunter, six experienced Michigan deer hunters were permitted to hunt inside a mile-square fenced enclosure that contained 39 deer. It took 14 hours of hunting to kill a deer during an any-deer season and 51 hours of hunting to kill one buck during a bucks-only season.



*Use a topographical map to scout good hunting spots before deer season begins.*



During one season, with good tracking snow, it wasn't until the fourth day that the hunters even saw one of the antlered bucks known to be present. It took 15½ man-days of hunting to locate and kill this buck inside a fenced area with snow on the ground.

## What gun to use

Conservation Department regulations permit firearms hunters a wide choice of weapons. They may legally use shotguns (slugs only); muzzleloading or cap-and-ball firearms .40-caliber or larger; rifles or handguns firing centerfire ammunition; or longbows, recurve bows, compound bows and crossbows. Beginning in 2008, air-powered guns, .40 caliber or larger, charged only from an external high compression power source (external hand pump, air tank or air compressor) may be used.

Prohibited weapons are full, hard metal-case projectiles, ammunition propelling more than one projectile at a single discharge and self-loading rifles having a capacity of more than 11 cartridges in magazine and chamber combined.

The muzzleloader portion of the firearms season provides muzzleloading firearms enthusiasts with additional deer hunting. Any person holding a firearms permit can hunt during the muzzleloader portion but are restricted to using a muzzleloading firearm; no other firearms, longbow or crossbow may be carried while hunting deer during this portion of the season.

What rifle should the beginner use? The choice of a deer gun is usually influenced by the hunter's desires, finances, advice from experienced hunters, and what is available. However, there are several other factors that should be considered: How good of a shot are you? Can you take the recoil of a large caliber rifle? Are you going to use the gun just for deer hunting? Are you going to hunt deer in Missouri only?

If finances are a problem, the hunter should consider using a shotgun. The one-ounce slug from a 12-gauge shotgun can be very effective at short range. About 3 percent

of Missouri's deer harvest is by shotgun. The effective range of a shotgun slug is only about 100 yards, but this range is adequate for Missouri conditions. In our rough terrain and brushy cover, most deer are killed at less than 100 yards.

Most shotguns, however, do not have adequate sights for accurate aiming at even 50 yards. A shotgun is designed to be aimed so that the spread of the pattern will cover the target. The chest area of a deer presents about a 12-inch target; therefore, the single slug must be aimed with considerably better accuracy than the



*The best deer rifle is the one you can shoot best.*



*Try out your gun thoroughly before deer season.*



shot pattern. Rifle-type sights for shotguns are available from several after-market companies. In addition, many manufacturers offer special rifled slug barrels for their shotguns and most allow for mounting a scope.

What do most people use to hunt deer during the firearm season? Around 87 percent of respondents to a 2004 survey of firearms hunters used a centerfire rifle. Smaller percentages used a muzzleloader (4 percent), bow (4 percent), shotgun (3 percent) and handgun (1 percent). What is the best centerfire rifle? There seem to be as many answers to this question as there are rifles available. A 1991 survey indicated that 68 percent of deer hunters used a .30 caliber rifle (.30-.30, .308, .30-06, etc.). Other popular deer calibers included the .270 (11 percent) and the .243 (9 percent).

The .30-.30 has probably killed more deer in the United States than any other cartridge. Since World War I, however, the .30-06 has become the most popular cartridge nationwide; ammunition is available nearly everywhere in a wide range of bullet weights and loadings. Since white-tailed deer are relatively thin-skinned, light-framed animals, there is little need for the heavier rifles—those in the .358 or .375 class or larger. Recoil from these guns is often so heavy that inexperienced shooters cannot use them with much success.

The best deer rifle is the one that any given hunter can shoot best. There are lots of wild stories and myths about the power of big-game rifles, and most of these big guns are vastly over-rated in their supposed killing power. A well-placed bullet of adequate weight and velocity will put a deer down to stay; and a poorly placed bullet, no matter how large, is the first step toward a wounded, lost animal. No high-powered cartridge is a substitute for good, accurate shooting. In recent years, the majority of serious deer hunters have chosen rifles in the .243, 6mm, .270, .30-.30, .308 and .30-06 class. These cartridges develop relatively light recoil, which makes them fairly easy to shoot accurately.

Whatever rifle you choose, try it out thoroughly before deer season. Sight it in carefully, and fire enough rounds on the shooting range to become accustomed to the recoil, the muzzle blast and the handling characteristics. Open sights are standard equipment on most rifles when they come from the factory and, therefore, are the type used by many hunters. A peep

or telescopic sight may be more satisfactory for the beginner. Most authorities agree that the peep sight is faster and more accurate than the open sight and it forces the beginner to get his or her cheek down on the stock of the gun when aiming. However, in the dim light of early morning or in heavy woods, it may be hard to see through the peep if the aperture is less than ⅛-inch in diameter.

Because of its light-gathering qualities, a good scope is a distinct advantage in dim light. For Missouri conditions, a 2- to 4-power scope is an excellent addition to a deer-hunting rifle, especially for the beginner or older hunter whose eyes may have trouble adjusting to open or peep sights.

## Equipment

The choice of other equipment can be as important as the choice of rifle. Proper equipment will make your hunt more enjoyable and directly assist you in bagging your deer. Advance preparation will certainly make the chore of field dressing and handling a deer much easier. The first consideration should be proper clothing. Clothing should be comfortable but not too warm. It is best to dress in layers so that you can be warm in the pre-dawn chill, but be able to remove sweaters or wool shirts in the heat of the midday sun.

Regulations require that during the firearms deer season all hunters must wear a hat and shirt, vest or coat of hunter orange (also known as daylight fluorescent orange or blaze orange) so that the color is plainly visible from all sides while being worn. Camouflage orange does not satisfy this requirement. Do not carry a white handkerchief; a careless hunter might mistake it for the tail of a deer when you pull it out of your pocket.

Good boots are necessary for walking over rough country. For sitting still in cold weather, a pair of insulated rubber boots or felt pacs is recommended.

A deer can be field dressed with a sharp pocket knife, but the job is easier with a sharp, stout knife having a straight, relatively thin, 4- to 6-inch blade with a dropped point. A saw or light hand ax and sledgehammer also are handy for splitting the pelvic girdle and chest cavity.

Comfortable clothing, a loaded rifle and a sharp knife, along with the appropriate deer hunting permit, are the only really essential items for a successful deer

hunt. That's all the equipment many Missouri hunters carry because they do not plan to go very far from their vehicle. Some additional items you might want to carry include:

- raincoat or poncho for rainy weather or as a windbreak on a stand
- flashlight for finding your stand in pre-dawn darkness
- topographic map of the area, compass or global positioning systems for locating stands and navigating in the woods
- 15-foot length of stout rope for dragging a deer, hoisting your unloaded rifle into a tree stand or for emergencies
- latex or rubber gloves to protect your hands while field dressing a deer
- strong plastic bag for a sanitary, bloodproof container for the heart and liver of your deer
- piece of cheesecloth or muslin to cover the body cavity of a field-dressed deer and protect it from insects in warm weather
- binoculars, which are especially important if you are hunting areas with special regulations such as an antler-point restriction

These items can be stuffed into your pockets, but a small backpack or beltpack can also be used. The bag also is a good place to carry your lunch and extra clothing, and it leaves both hands free for handling the rifle.

## The hunt

A new hunter can secure the advice and assistance of a landowner or experienced deer hunter who will know which areas deer are using at the time, the location of the best crossings and the probable movement pattern of deer through the area.

Most hunters in Missouri hunt from a stand, at least during early morning and late afternoon. A good stand is located where deer will pass in going about their daily routine of feeding, watering and resting. And during late October through November, deer show increased activity associated with the breeding season.

Deer are creatures of habit and follow nearly the same routes in going from feeding areas to water to resting areas. In areas with many deer,



*The vital area of this deer is within the diamond.*



*This buck, third largest typical white-tailed deer known to exist, was taken in Randolph County in 1971 by Larry Gibson. It scored 205 0/8 on the Boone and Crockett scale.*

their daily movements make clearly defined paths. The point where two paths cross is an excellent place for a stand because it doubles the hunter's chances. Always place your stand so the wind will blow your scent away from the path or crossing. Sitting with your back against a tree or rock will help to break up your silhouette, but remaining motionless is more important than concealment.

Another good location for a stand is the edge of a field or forest clearing where deer come to feed in the early evening or early morning. A permanent or portable tree stand or the increasingly popular metal ladder stand overlooking a clearing usually provides good deer hunting. A hunter in a tree stand can see better over a larger area, and is less likely to be detected by the deer. For safety's sake, never climb into a tree stand with a loaded gun and always wear a safety harness.

The secret of hunting from any stand is to sit still, stay alert and stay on the stand. This type of hunting requires a lot of patience. Patience is hard to maintain on a cold November morning. Few hunters actually stay on the stand for more than three or four hours. Observations from airplanes indicate that by 9 a.m.

## Tree stand safety

Each year deer hunters are injured in tree stand-related accidents. Injuries range from minor scrapes and bruises to broken bones to permanent paralysis to death. One thing these accidents have in common is that most are preventable. Avoid injury by following these safety tips:

- Practice with your stand at ground level until you are skilled at using it.
- Choose the stand location carefully—avoid trees with hollow trunks or rotten branches that could fall.
- Inspect your stand each time you climb into it—look for loose bolts or nuts, slick surfaces, cracked or bent metal, and worn chains, cables or straps—check permanent stands for loose steps, rotten wood and exposed nails or screws.
- Always wear a safety harness while climbing up to and down from a stand, and also while on the stand.
- Never carry a bow, arrows or a rifle while climbing—use a rope to haul these items into the stand after you are securely positioned.
- Don't leave equipment on the ground directly below you while climbing—falling on it could worsen your injuries.
- While on the stand, keep yourself on a short leash—8 to 12 inches is plenty.
- Climb down from your stand before you grow sleepy or the weather turns bad and climb down immediately if you feel ill.
- Prepare for an emergency. Tell others where you will be and when you will return. Carry a whistle, strobe light, airhorn, walkie-talkie or other means of signaling for help. Remember: Cell phones don't always work in the woods.



most of the hunters are beginning to move through the woods and are resorting to still-hunting. Another name for still-hunting is stalking. As the name implies, the hunter moves as slowly and quietly as possible through the woods, hoping to see a deer before it sees him or her. This technique works best with snow on the ground or when the leaves are wet from rain. It is very difficult to move quietly through several inches of dry oak leaves. This method often results in the hunter seeing a lot of white flags disappearing over the ridge top, but not much venison. Some wise guy on a stand will probably kill the deer that is sneaking along ahead of you.

An organized deer drive is a technique sometimes used in large tracts of timber in the Ozarks or on smaller tracts in northern Missouri. This method requires coordination and cooperation to ensure safety. One or more hunters, designated as “shooters,” are placed on stands where deer are likely to cross when pushed by the “drivers.” Drivers are other hunters in the party that move through a part of the hunting area in an attempt to push deer toward the shooters. It is critical that all shooters know the locations of other shooters and also the direction from which the drivers will come. This allows the shooters to determine safe lines-of-fire. Shooters must not leave their stands until the drive is over, and the drivers must stay in line and not stray from their predetermined approach. Knowing the location of others participating in the drive is the key to a successful and, more importantly, safe hunt.

No matter which system of hunting you use, be quiet but alert and be sure of your target before shooting.

Your target on a deer should be the chest. Shots in the head or spine will drop a deer in its tracks, but the target is small and the average hunter is wiser to shoot at the chest. A shot in the chest may not drop the animal immediately, but is usually fatal.

“Hold low” is an old slogan among deer hunters. There are several good reasons for this idea. The heart of a deer is located in the lower third of the chest about 4 inches behind the elbow of the front leg. If the hunter is excited and does not get his or her cheek down on the rifle stock, the bullet will hit higher than the point of aim. Also, most hunters do not realize that the average deer is only about 3 feet tall at the shoulder.

The point of aim for a deer standing broadside should be slightly behind and above the elbow of the front leg. Aiming at this point gives an allowance for error of several inches in all directions. Aim at the base of the neck on a deer facing you. Extreme uphill and downhill shots should be aimed a little low. If the deer’s racing directly from you, let him go. You’ll probably shoot at his flag and miss him anyway. A running deer is a difficult target and not suggested for beginners.

## Archery deer hunting

Archery deer hunting is one of the fastest-growing sports in Missouri. Only 73 archers participated in the first archery season in 1946, a three-day, bucks-only season in Crawford County. Currently, over 135,000 archers participate in a 112-day, statewide any-deer season and typically harvest more than 40,000 deer.



Many archers previously hunted with a gun but took up the bow because they wanted more of a challenge. In addition, the three-month archery season provides a longer time to enjoy the hunt. Also, the two deer taken on an Archer's Hunting Permit are in addition to deer taken on firearms deer permits. Whatever their reasons for pursuing deer with bow and arrow, these hunters are knowingly handicapping themselves. Because of this handicap they must learn more about deer; in the process they will become better deer hunters. Archers must be able to get close to their targets, since accuracy with a bow declines rapidly beyond 30 yards. Most deer killed with arrows are shot at 20 yards or less.

How does an archer get so close to a deer? The advice from one archer of long experience and some success is: "Go often, go to the same place each time and use a tree blind." Most archers hunt from tree stands about 15 feet high. The general rules for location of the stand and hunting techniques are similar to those suggested for the gun hunter, but some additional techniques are needed. The archer must be especially aware of wind direction. Some archers tie a 6-inch length of thread to the upper limb of their bow, to serve as a miniature windsock.

Archers sometimes build a blind of natural vegetation. The blind should blend with the surroundings, but it does not need to be as solid as a duck blind. It should be roomy enough for the archer to draw a bow without hindrance and should be about shoulder-high when the archer is sitting on a small stool or other seat. Many commercially produced blinds are now available that cater to archers.

In contrast to the bright clothing worn by the hunter with a gun, most archers wear camouflaged clothing of various patterns that will blend with the surroundings. Some archers use camouflage paint or face masks to hide their face and hands. However, during certain portions of the firearms season, archers are required to wear hunter orange.

The experts also suggest that archers pace off the distance to the point where they expect to shoot at a deer, check the anticipated flight path of the arrow and trim away branches or small twigs that might deflect an arrow.

Archery equipment has changed over the years. Hunting bows are of three types: straight (longbow),

recurve and compound. They are made from a variety of materials including metals, woods and fiberglass. Bows are classed according to the amount of pull (in pounds) that is required to draw the string to 28 inches. The compound bow, which was first developed in Missouri, uses a system of pulleys to relax draw weight at full draw by as much as 85 percent. Arrows shot from a compound have a flatter trajectory and are faster than those shot from a comparable recurve bow.

Beginning archers tend to select a bow that is too strong for them. The best way to pick a bow is to visit an archery club or pro shop and get the advice of experienced archers. Examine the many different kinds of bows and choose the type best suited for you. Hunting arrows are made of wood, fiberglass, carbon fiber or aluminum and are tipped with razor-sharp cutting heads called broadheads. The arrow kills by causing hemorrhage, so the blades should be kept as sharp as possible. Practice arrows and hunting arrows should be of the same weight and both should be matched to the strength of the bow. Other devices that can improve accuracy include string releases, peep sights and carbon arrows. Based on a 2004 survey of archers, today's typical archer shoots a compound bow (89 percent) with a draw weight of 55–65 pounds and uses a string release (81 percent), carbon arrows (58 percent) and a peep sight (76 percent).

A back quiver or leg quiver is fine for target shooting, but most hunters prefer the bow quiver which holds extra arrows on the bow ready for fast reloading.

Target practice is even more important to the archer than to the hunter with a gun. This practice is much easier to come by, however, because you can shoot at a sturdy backstop in your yard. Practice until you can put that first arrow into a 6-inch circle at 30 yards, then try shooting at targets downhill and uphill. The field range at an organized club is a good place to learn to hit targets at different distances and different elevations.

## Field dressing

A deer down is not necessarily a deer dead, so reload and watch the deer from a short distance. If you do not detect movement for a few minutes, approach cautiously from behind the deer's head. Set your firearm or bow aside only after you are certain the deer is dead. If the eye does not blink when touched with a stick, it's

## Field dressing steps



**❶** Insert your knife point under the hide only and make one long, straight incision up the belly. The natural tautness of the hide will cause the skin and hair to pull away, giving you unobstructed access to the abdominal muscle tissues.



**❷** Using short, shallow, slicing strokes, open the body cavity by cutting the skin, fat and abdominal muscle tissue. As the tissue separates, use your fingers to enlarge the abdominal opening until you can fit your hands into the body cavity.



**❸** If you wish to have your deer head mounted, stop the incision at the bottom of the rib cage. Otherwise, continue the opening all the way to the fleshy, hollow junction of the neck and chest.



**❹** Using a saw, large knife or small axe and sledgehammer, open the chest cavity by separating the rib cage. This will allow easier removal of the heart and lungs.



**❺** Severing the windpipe will make it easier to remove the stomach and lungs.



**❻** Carefully sever the connective tissue holding the interior organs to the diaphragm, and pull the entire mass of organs back toward the pelvic opening.

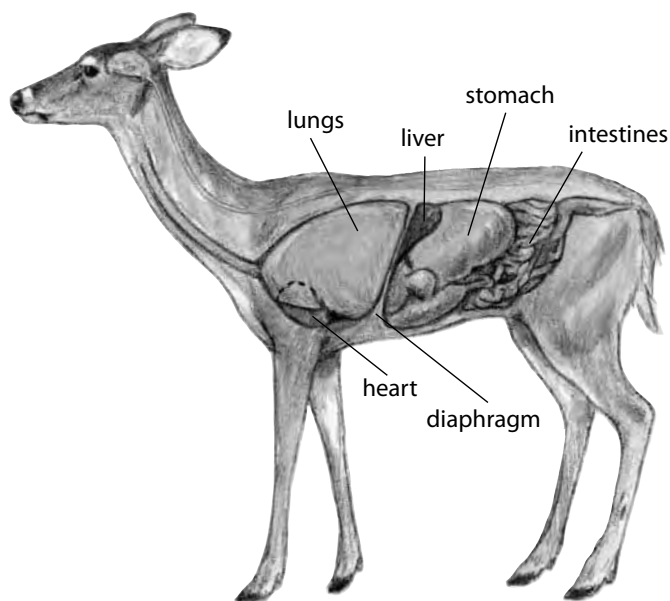


**❼** Using a saw, large knife or small axe and sledgehammer, open the pelvis to ease removing the organs. Lay the bulk of the organs outside the carcass. Guide the lower intestine through the pelvic opening, then sever the anus and sphincter muscle from the carcass.

**❽** Prop body cavity open with sticks and cool quickly by hanging with head up in a shady, airy place. Let it hang this way for about an hour before moving it to camp or car.

illustrations by Mark Raithel





yours. Now is the time to fix your deer transportation tag securely around the hind leg.

Field dress the deer immediately to ensure a rapid loss of body heat. Hang the animal head-up or lay it on a slope with the rump lower than shoulders.

Strong juices from the paunch will taint the meat and should be removed if the animal was gut shot or if you accidentally cut the paunch while field dressing the deer. A rag or bunches of leaves may be used to wipe out the juices or they may be washed out with water. Some articles state the carcass should not be washed with water, because of the potential to promote bacterial growth. However, thorough cleaning when the paunch has been punctured makes washing and then patting the cavity dry an appropriate procedure.

A piece of cloth wrapped around the carcass will keep out flies and dirt as you drag it out of the woods or transport it.

The carcass should be dragged or carted out of the woods and not carried on your shoulders. A deer on the shoulders could invite a shot by another hunter. The antlers of a buck make a good handle for dragging. Some hunters tie the front feet behind the head of the carcass to keep them from catching on brush. A strong stick between the hind hocks will provide a good handle for dragging does or fawns. There also are many commercially produced deer carts, which are used by an increasing number of hunters.

The deer should be kept as clean and as cool as possible during transport. A plastic bag full of ice

placed inside the carcass will keep it cool if you have a long trip home.

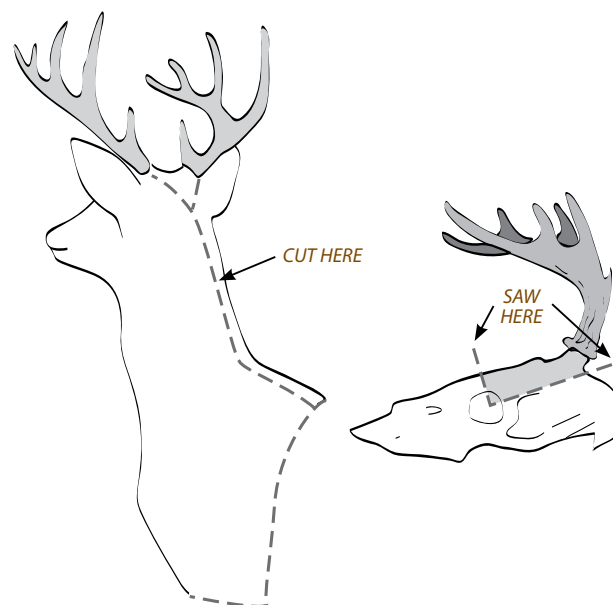
## Trophy preparation

Deer hunting is indeed an exciting sport and trophies are popular reminders of successful days afield. Head mounts, racks and hides are the most common deer hunting trophies. However, deer legs are often used as gun racks, lamp bases and bookends. Hides also can be used to make items of clothing, wallets and purses. Whether you decide to make your own trophy or leave the job to a professional, the way you handle your deer from the moment it is downed will affect the quality of the product.

For instance, if you plan to mount your deer head, do not cut the animal's throat. In fact, make no cuts in the head and neck region other than those indicated in the following diagram. This method of skinning will allow plenty of hide for a full head-neck-and-shoulder mount. After skinning, sever the head from the neck and take head, antlers and hide to your taxidermist. If you anticipate any trouble, you might let your taxidermist tackle the caping chore.

Another method of displaying antlers that is inexpensive, yet attractive, is to attach them directly to a backboard or wall. Simply saw off a good, solid section of skull with the antlers and fasten through a hole drilled in the middle. Deer hide or felt can be used to cover the skull-plate, if desired.

If you plan to have the hide processed, remove all the flesh and fat from the skin with a dull knife while





*This world-record non-typical white-tailed buck was found dead, apparently of natural causes. It weighed 250 pounds and scored 333 7/8 on the Boone and Crockett scale.*



*David Reid took this non-typical buck in October 1991 in Adair County, using a compound bow. It qualified for the Show-Me Big Bucks Club with a score of 188 6/8 on the Boone and Crockett scale.*

the skin is fresh. If you cannot work on the skin when it is fresh, freeze it until you are ready and then allow it to thaw. Then rub salt onto the flesh side and roll it up, flesh side in and send it off to the processor.

A list of licensed taxidermists is available on request from the Conservation Department. There also are a number of reputable companies that will process your deer hides if you do not want to do it yourself.

## **Recognizing record antler points**

The Missouri Show-Me Big Bucks Club is a statewide organization affiliated with the Boone and Crockett Club. The purposes of the club are: to officially recognize Missouri trophy deer heads and to honor the successful hunter; to promote interest in and appreciation for Missouri deer hunting; to promote sportsmanship among deer hunters; to establish and maintain a permanent record of trophy deer heads taken in Missouri; and to assist eligible members to receive national recognition from the Boone and Crockett Club.

Membership in the club is available to any hunter who has, during any legal hunting season, taken a trophy that meets the standards of the club. Scoring is based on the system of measurements developed by the Boone and Crockett Club. Official club scorers are located throughout the state. Membership in the Show-Me Big Bucks Club will be based on scores submitted by the official club scorers, verified if necessary by officials of the club. Minimum scores for membership are 140 points for typical and 155 points for non-typical deer taken statewide. Other organizations also keep records of antler points, such as Archery Big Bucks of Missouri and Pope and Young Club.

Many beautiful racks of antlers are taken in Missouri each fall. Larry Gibson (see page 19) took our best typical trophy head in 1971 in Randolph County. The antlers scored 205 points on the Boone and Crockett system and ranked third in the latest edition of the club's records of North American Big Game. The world-record non-typical whitetail was found in St. Louis County in 1981 (see above left). It scored 333 7/8.

Do you have a record set of antlers? A score of more than 140 is exceptional and should be entered in the record book. Go to [www.boone-crockett.org](http://www.boone-crockett.org) and score your deer's rack according to the instructions on the official score sheet.

# PREPARING AND COOKING VENISON

Venison is a healthy and delicious meat choice, but the road to a tasty meal requires care in the processing and preparation. If you've had gamy tasting venison before, chances are the offensive taste was obtained through processing or cooking. The meat's quality is a result of the deer's age, sex and diet. Older deer have tougher meat, while the meat of bucks in rut is stronger tasting from the stress of breeding season.

For nutritional value, venison is low in fat and calories and rich in protein. Use low-fat cooking techniques, such as broiling, grilling, baking or stewing instead of frying to keep the venison healthy.

All in all, just keep in mind the deer you are cooking and match it with the right cooking technique—roasting and stewing for tougher cuts and frying, broiling and grilling for more tender cuts.

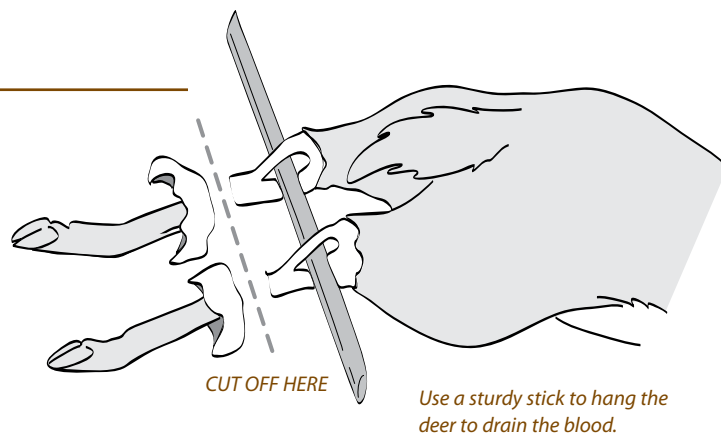
## Processing

For better venison, hang the deer before processing. Leave the skin on to prevent dehydration and keep the meat clean. A handy way to hang the carcass (and also remove scent glands) is illustrated below. Hang the deer to drain blood and cool to 50° F. within six hours of harvest. Freezing the venison more quickly will result in tougher meat.

Aging venison any longer is not necessary; but when stored at 34–40° F. for up to eight days, the taste and tenderness of venison cuts can be improved.

The following tools are needed for home processing: hand saw, cutting board or solid table, a flexible knife for boning, a stout knife for trimming fat and making larger cuts, a knife sharpener, freezer paper, plastic wrap, masking or freezer tape, and a marker. To help sort meats for stewing and grinding, large plastic or metal tubs or bowls are handy.

There are many ways to process a deer and those experienced at processing often have



their own special way of doing it. What we present are some general guidelines for the beginner. Remove the skin and take care to keep the hair side away from the carcass. Be sure to remove as much fat as possible (deer fat has a strong flavor). Trim any bruises or gunshot damage and wash the outside. After dripping dry, the carcass is ready to be cut.

There are two basic methods for cutting the carcass. The boneless method produces a milder flavor; all bone is removed and the more tender muscles are used for steaks, roasts, and stew; the less tender muscles are ground. One point to remember is that young-of-the-year deer are so tender that the whole animal can be cut into steaks. You can also use the method similar to one used to cut up a beef carcass. This method results in popular cuts such as rib, T-bone, sirloin and round steaks. Combinations of the two methods may be used.

Regardless of method, use the chart on page 25 to produce wholesale cuts similar to those at a grocer. Start by removing the neck for boning and split the carcass by cutting down the center of the backbone. Then either bone or cut with the bone-in cutting

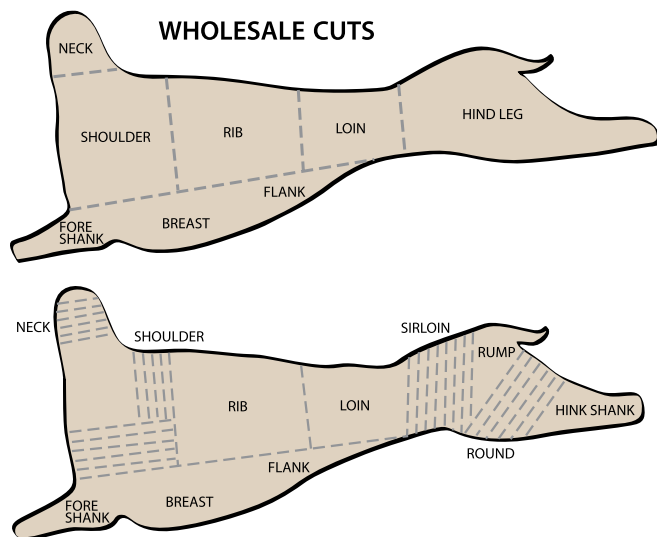
**Before processing, you must check your deer using the Telecheck system, write the confirmation number on your permit and attach it to your deer.**

## Nutrient content of domestic and wild game meats

(cooked, 3-ounce serving, unless otherwise indicated)

Domestic	Calories	Protein	Iron	Total Fat	Saturated Fat	Cholesterol
Beef	184	25	3	8	3	73
Pork	180	25	1	8	3	73
Chicken (roasted, skin off)	161	25	1	8	2	76
<b>Wild Meats</b>						
Deer	134	26	4	3	1	95
Turkey	121	26	—	1	—	55





method as used in beef cutting. Sawing through bone spreads the bone marrow across cuts of meat, sometimes creating a bad flavor. If you saw through cuts, be sure to scrape away any marrow or bone fragments. Also, carefully remove all animal hair.

### ***Wholesale cuts***

Place the half carcass on a cutting table and remove the flank, breast and shank. Remove the shoulder by cutting between ribs five and six perpendicular to the backbone. Separate the rib from the loin behind the last rib and cut the loin from the sirloin in the middle of the last lumbar vertebra. The wholesale cuts of deer are neck, shoulder, rib or rack, loin, hind leg, foreshank, breast and flank.

### ***Labeling***

Label each package clearly with a permanent marker. Make the letters large enough for easy reading. Labels should include the owner's name, address and Telecheck confirmation number; the name of the cut; the quantity; and the packaging date.

### ***Freezer storage time***

Venison can be stored in the home freezer at 6° F. or lower for about one year.

## **Making sausage and jerky**

Venison can make excellent sausages and jerky. Avoid using deer fat in the sausage; it makes the flavor stronger and does not store well. If you choose to add

fat, pork fat works well for ground, processed meats because it adds flavor and moisture to the meat and keeps well. The amount of fat you add to your sausage can vary with your personal taste and diet needs.

For more tender jerky, ground venison may be substituted for the venison strips when using a dehydrator. To make thin strips, use a jerky gun or roll out meat between two pieces of waxed paper by using a rolling pin. Form into strips by shaping with a pizza cutter. Place strips on drying racks.

### **Ground Meat Mix for Basic Deer Sausage**

5 pounds venison  
1 pound fresh pork fat  
2–4 tablespoons salt

Grind the meat and fat thoroughly, mix in salt and add one of the seasoning recipes. Knead one of the seasoning mixes listed below into meat. Keep mixture cold.

### **Salami Seasoning**

2 tablespoons sugar  
1 tablespoon cayenne pepper  
1 teaspoon ground cloves  
1 tablespoon fine-ground pepper  
2 teaspoons garlic powder  
¾ cup dry milk (mix to a thin paste)

### **Sausage Seasoning**

2 tablespoons sugar  
1 teaspoon cayenne pepper  
1½ tablespoons chili powder  
1 tablespoon garlic powder  
1½ teaspoons ground celery seed  
¾ cup dry milk (mix to a thin paste)

### **Pepperoni Seasoning**

2 tablespoons sugar  
1 teaspoon ground cumin  
1½ teaspoons leaf oregano  
1 teaspoon thyme  
1 tablespoon cracked pepper  
1 tablespoon fine-ground pepper  
3 tablespoons chili powder  
1 teaspoon whole anise  
¾ cup dry milk (mix to a thin paste)



To stuff and cook the sausage, you can use casings available from a local meat processor or aluminum foil wrapping.

If using casings, follow instructions for the type (run water through animal casings). To fill, use stuffing attachments for your meat grinder and pack tightly into casings.

For foil wrapping, place 1–2 pounds of mixture on a rectangle of foil and pull up opposite sides. Press to pack meat tightly, then fold the foil tightly against the meat. Turn and roll ends until tight.

Bake sausage in the oven by placing the stuffed casings or foil on a rack in a baking pan. Bake for 1 hour and 20 minutes at 300° F. Remove and cool rapidly.

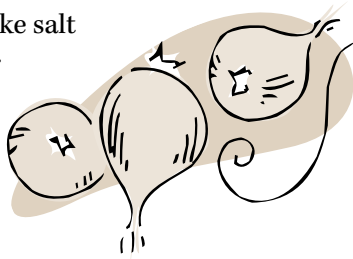
### **Summer Sausage**

2 pounds ground venison  
1 cup water  
3 tablespoons quick cure salt  
¼ teaspoon pepper  
⅛ teaspoon garlic powder  
¼ teaspoon onion salt  
½ teaspoon mustard seed  
1 tablespoon liquid smoke

Mix all ingredients well. Shape on aluminum foil in two rolls. Twist ends of rolls to secure. Refrigerate for 24 hours. Place in kettle and cover with water and boil 1 hour. Remove and punch holes in foil to drain water.

### **Buck's Jerky**

2 pounds venison strips, cut ¼–½" thick  
¼ cup soy sauce  
¼ teaspoon black pepper  
½ teaspoon onion powder  
½ teaspoon salt  
A few drops of liquid smoke  
1 tablespoon Worcestershire sauce  
¼ teaspoon garlic  
1 teaspoon hickory smoke salt  
Dash of cayenne pepper



### **Hot Jerky**

1 pound venison strips, cut ¼–½" thick  
4 teaspoons salt  
1 teaspoon each of pepper, chili powder,  
garlic powder and onion powder  
¼ teaspoon cayenne  
3 dashes liquid smoke  
½ cup water

To cut thin, even slices, use meat that is partially frozen. Cut the strips lengthwise with the grain and about 1 to 2 inches wide. Mix one of the above seasonings and place the meat and seasonings in a resealable plastic bag. Work the seasonings into the meat with your hands. Refrigerate for several hours or overnight.

To dry, place on dehydrator trays and follow the directions of the appliance. Jerky can also be dried in an oven by hanging the strips with toothpicks from the racks. Cook for 10–12 hours at 150° F. with the door slightly ajar to allow moisture to escape. Place a tray under jerky to catch drips.

### **Marinades**

Marinating venison enhances the flavor, moisturizes and helps tenderize the meat. Here are a few basic marinades for use with grilling (steaks or kabobs), stir frying, broiling and baking. Commercial marinades are also available at your supermarket. If steaks or other cuts of venison may be tough, tenderize with a mallet before placing in marinade.

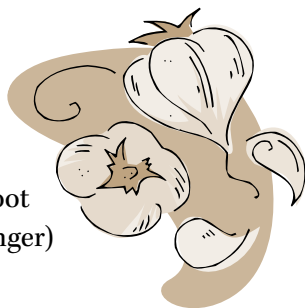
#### **Red Wine Marinade**

½ cup dry red wine  
⅓ cup chopped onion  
2 tablespoons olive oil  
½ teaspoon thyme, rosemary or marjoram  
¼ teaspoon salt  
¼ teaspoon coarse pepper  
1 clove garlic, minced

Mix together. Pour over meat in plastic bag and knead mixture together. Marinate at room temperature for 30 minutes or in the refrigerator for up to 6 hours.

### **Teriyaki Marinade**

- ¼ cup soy sauce
- 2 tablespoons orange juice
- 1 tablespoon molasses
- 1½ teaspoons grated ginger root  
(or ½ teaspoon ground ginger)
- 1 teaspoon dry mustard
- 1 clove garlic



Mix together. Pour over meat in plastic bag and knead mixture together. Marinate in refrigerator for 10 hours or overnight. Vegetables can be marinated in mixture for kabobs or stir-fry, if desired.

### **Herb-Lemon Marinade**

- ⅓ cup lemon juice
- ¼ cup olive oil
- ¼ cup Worcestershire sauce
- 1 tablespoon honey
- ½ teaspoon basil, crushed
- ½ teaspoon thyme, crushed
- ⅛ teaspoon garlic salt
- ¼ teaspoon pepper

Mix together. Pour over meat in plastic bag and knead mixture together. Marinate in refrigerator for 6–10 hours. Marinade is good with vegetables for grilling or stir-fry.

### **Fajita Marinade**

- ½ cup salsa
- ½ teaspoon pepper
- 1 teaspoon Worcestershire sauce
- ½ cup red wine
- 1 garlic clove, crushed
- 1 tablespoon lime juice

Works best with thinly sliced venison. Mix together. Pour over meat in plastic bag and knead together. Refrigerate 1–6 hours. Use as a stir-fry for fajitas or your favorite southwestern recipe.

## **Main dishes**

Take care in cooking cuts of venison. Always trim off all fat and as many of the tendons as possible before cooking. Most cuts can be prepared similar to beef. Tender cuts, such as the loin, rib and sirloin, can be broiled or roasted. Shoulder and hind cuts, such as round steak and arm and blade chops, are best cooked by stewing, braising or pot-roasting. Use tougher cuts in stews and ground venison. Try to keep meat moist and do not overcook.

Many traditional recipes for preparing venison are found in *Cy Littlebee's Guide to Cooking Fish and Game*, available from the Missouri Department of Conservation. Here are a few popular recipes adapted for venison.

### **Venison-Bacon Appetizer**

- 1 bottle Italian salad dressing
- 1 pound venison steak, tenderized
- 10 ounces bacon
- Jalapeno peppers or water chestnuts

Cut venison in thin strips 1 inch by 3 inches. Marinate in salad dressing for 6–12 hours. Remove venison strips from marinade and roll around a chestnut or pepper, then with a bacon slice cut in half on outside. Secure with a toothpick. Grill or broil 10–12 minutes or until done.

### **Quesadillas**

- 1 pound ground venison
- 1 cup or more salsa
- 8 large flour tortillas
- ½ cup chopped green pepper
- 4 chopped green onions
- 2 cups shredded Monterey Jack cheese
- Refried beans, optional
- Jalapeno peppers, optional

Cook ground venison adding ½ cup salsa and salt and pepper to taste. Remove from skillet. Spread refried beans on half of each tortilla, if desired. Top with peppers, onions and seasoned venison. Sprinkle cheese over half of each tortilla and fold in half, pressing gently. Cook quesadillas in a large skillet over medium heat until lightly browned, turning once. Cut into wedges and serve with salsa. Serves 4.



## **Venison Pot Pie**

1 pound venison, cut into ½-inch cubes  
2 tablespoons cooking oil  
2 cups beef broth  
1 teaspoon thyme, crushed  
¼ teaspoon pepper  
1 10-ounce package frozen peas and carrots  
2 medium potatoes, peeled and cubed  
½ cup beef broth  
⅓ cup flour  
¾ cup flour  
¾ teaspoon baking powder  
½ teaspoon sugar  
3 tablespoons butter  
⅓ cup milk

Remove all fat from meat. Brown meat in hot oil in a large saucepan. Stir in the 2 cups broth, thyme and pepper. Bring to a boil, then reduce heat, cover and simmer for 45 minutes. Add vegetables and simmer until meat is tender (15–30 minutes). Mix the ½ cup broth and ⅓ cup flour. Add to meat mixture and cook until thickened. Pour into a 2-quart casserole dish. Prepare the biscuit topping by stirring together the ¾ cup flour, baking powder, sugar and a dash of salt. Cut in the butter. Make a well in the center and add the milk. Stir until just mixed, then spoon in 6 mounds atop the meat and gravy. Bake at 450° F. for 12 minutes. Makes 5 servings.

## **Venison Pizza**

1 package yeast  
4 cups flour  
2 teaspoons salt  
¼ cup olive oil (optional)  
1½ cups warm water

Mix yeast, flour and salt. Add warm water and oil and mix. Knead on a floured surface until dough is soft. Place in greased bowl to rise for about 1 hour. While dough is rising, prepare the following:

1–2 pounds ground venison  
½ cup chopped onion  
½ cup chopped green peppers  
Salt and pepper

Brown venison with peppers and onions in a skillet. Remove from skillet and set aside.

2 cups sliced mushrooms  
1 clove garlic, sliced  
1 cup green peppers, sliced in strips

Sauté peppers and garlic in olive oil. Add mushrooms and finish cooking. Drain and set aside. Prepare the following:

Pizza sauce or tomato paste  
Diced pepperoni or Canadian bacon  
Grated mozzarella cheese

Roll out half of dough to fit pizza stone or pan. Spread on a thin layer of sauce, then cover with half of venison, pepperoni or bacon, mushrooms and peppers, and then cheese. Repeat for the other pizza. Bake at 450° F. for 15–20 minutes. Makes 5 servings.

## **Venison Chili**

Good for strong or tough venison  
1–2 pounds ground venison (or cuts in 1-inch cubes)  
1 cup chopped onion  
½ cup chopped green pepper  
2 cloves garlic, minced  
1 14 ½-ounce can tomatoes, chopped  
1 15-ounce can dark red kidney beans, rinsed and drained  
1 8-ounce can tomato sauce  
2 to 3 teaspoons chili powder  
½ teaspoon basil  
½ teaspoon salt  
¼ teaspoon pepper

Place venison, onion, pepper and garlic in a large saucepan and brown in about 2 tablespoons oil. Add the remainder of ingredients and bring to a boil. Reduce heat, cover and simmer for 30 minutes to 1 hour until meat is tender. Serves 4–6.

## **Venison and Vegetable Stir-fry**

1 cup water  
¼ cup soy sauce  
2 tablespoons white wine  
2 teaspoons cornstarch



1 pound venison, tenderized  
 2 tablespoons oil  
 10 green onions, chopped  
 1 cup mushrooms, sliced  
 5 cloves garlic, sliced  
 3 cups broccoli and green peppers, chopped  
 Hot cooked rice

Stir together water, soy sauce, wine and cornstarch for marinade. Pound venison cuts with a meat tenderizer and cut into ½-inch pieces. Mix meat with half the marinade. Refrigerate 30 minutes, remove and drain. Heat oil in wok or large skillet. Stir-fry onions, mushrooms, vegetables and garlic. Remove from wok or skillet. Add venison to hot pan. Stir-fry until done. Push meat to center and add remaining marinade. Cook until thick, then add vegetables to coat. Serve on cooked rice. Serves 4.

### **Basic Venison Burgers**

1 pound ground venison  
 3 tablespoons finely chopped onion  
 3 tablespoons finely chopped green pepper  
 ¼ teaspoon salt and pepper  
 ½ teaspoon hickory smoke salt  
 ½ teaspoon seasoning salt or one clove garlic, minced

Mix well. Form into patties and grill, fry or broil.

### **Swedish Meatballs**

1 beaten egg  
 2 tablespoons milk  
 1 cup soft bread crumbs (2 slices)  
 ½ cup onion, chopped fine  
 ¼ cup snipped parsley  
 ¼ teaspoon pepper  
 1 teaspoon salt  
 1 pound ground venison  
 ½ pound ground pork  
 1 tablespoon butter  
 2 tablespoons flour  
 2 teaspoons beef bouillon  
 2 cups milk  
 2 cups of mushrooms, sliced  
     or 1 can cream of mushroom soup  
 1 tablespoon sherry  
 Hot cooked noodles, rice or potatoes

In a mixing bowl, combine egg and 2 tablespoons milk. Stir in bread crumbs, onion, parsley, pepper and salt. Add meats and mix well. Shape into 30 meatballs. Cook meatballs in a large skillet in hot butter, turning to brown evenly. Remove from skillet when done and drain. Leave about 2 tablespoons of drippings in the skillet and add the flour, bouillon and a dash of pepper to the drippings and mix. Stir in the milk and mushrooms or soup. Cook and stir over medium heat until thickened and bubbly. Cook and stir for 1 minute and add meatballs to skillet. Heat through.

### **Venison Pot Roast**

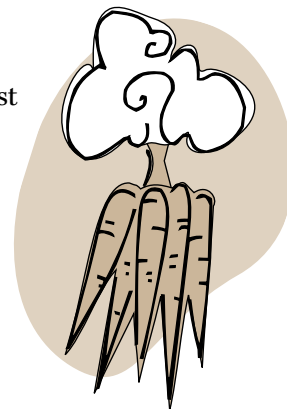
2–3 pound boneless venison roast  
 2 tablespoons cooking oil  
 ¾ cup tomato juice  
 ½ cup finely chopped onion  
 ½ cup finely chopped carrot  
 2 teaspoons beef bouillon  
 3 tablespoons flour  
 ½ cup sour cream or plain yogurt

Remove all fat from roast. In a 4- to 6-quart pot, brown meat in oil. Blot any remaining oil or fat. Add juice, onion, carrot and bouillon. Bring to a boil, then reduce heat and simmer, covered, for 1½ to 2 hours until meat is tender. Remove meat. To make a sauce, add water to juices to equal 2 cups of liquid. Stir flour into sour cream or yogurt. Stir into juices in pot. Cook and stir over medium heat until thickened and bubbly. Season to taste. Serves 4–5.

### **Pot Roast and Vegetables**

2–3 pound boneless venison roast  
 2 tablespoons cooking oil  
 ½ cup chopped onion  
 1 clove sliced garlic  
 2 teaspoons beef bouillon  
 Salt and pepper to taste  
 Peeled potatoes, carrots  
     and onions

Remove all fat from roast. In a 4- to 6-quart pot, brown meat in oil. Blot any remaining oil or fat. Add onion, garlic, bouillon, salt and pepper. Pour in



1 to 2 cups water and cover. Bring to a boil, then reduce heat and simmer, covered, for 1½ to 2 hours until meat is tender. Add vegetables cut into chunks for quicker cooking. Make sure vegetables are covered with broth or add enough water to cover. Allow vegetables to simmer in broth for 30 minutes.

### **Venison Loin Roast**

1 cup ground pecans or walnuts  
½ cup breadcrumbs  
2 tablespoons fresh parsley, chopped  
2 tablespoons oil  
2 teaspoons coarse black pepper  
½ teaspoon salt  
3-pound boneless venison loin roast

Combine nuts, breadcrumbs, parsley, oil, pepper and salt in a bowl. Place the roast on a rack in a roast pan and rub with a small amount of oil. Coat the roast with the nut mixture on all sides, pressing to make it stick. Roast in the oven at 425° F. for 30 minutes or until desired doneness. Let rest for 5 minutes before slicing.

### **Mushroom and Venison Stew**

*Good for strong or tough venison*

2 tablespoons flour  
1–2 pounds venison stew meat, cut in ¾-inch cubes  
2 tablespoons cooking oil  
3 teaspoons beef bouillon  
4 cups water  
1 large onion, cut into wedges  
1 clove garlic, sliced  
1 teaspoon Worcestershire sauce  
¼ cup red wine  
½ teaspoon marjoram  
½ teaspoon oregano  
1 bay leaf  
1 teaspoon coarse pepper  
2½ cups cubed potatoes  
1 cup sliced carrots  
1 cup sliced celery  
1½ cups sliced mushrooms



Drench meat cubes in flour and brown in a large saucepan in hot oil. Drain oil. Add the bouillon, water, onion, garlic, Worcestershire, wine, herbs, salt and pepper. Bring to a boil and simmer until meat is tender

(1–2 hours). Stir in potatoes, carrots, celery and mushrooms. Bring to a boil, then reduce heat. Simmer 20–30 minutes until vegetables are done. Remove bay leaf. Serves 6.

### **Grilled Kabobs**

1 pound venison sirloin  
1 recipe herb-lemon marinade  
(see page 27)  
1 medium onion, cut into wedges  
1 small zucchini, ½-inch slices  
1 red or green pepper, cut in 1-inch pieces  
Whole mushrooms  
Cherry tomatoes

Partially freeze venison and slice ¼-inch thick. Pour ⅔ of the marinade over venison and refrigerate for 3–4 hours. Steam onion, zucchini and green pepper in microwave until almost done. Remove and drain. Toss all vegetables in remaining marinade to coat. Thread meat and vegetables on metal or bamboo skewers. Grill for 10–12 minutes or until meat is done. Brush with remaining marinade from vegetables. Serves 4.

### **Swiss Steak**

1–2 pounds venison round steak  
3 tablespoons flour  
½ teaspoon salt  
¼ teaspoon pepper  
2 tablespoons oil  
1 16-ounce can tomatoes, sliced  
1 medium onion, sliced and ringed  
½ cup sliced celery  
½ cup sliced carrot  
½ teaspoon thyme  
Rice or noodles

Cut steaks into 4 or more pieces. Mix flour, salt and pepper. Tenderize meat with a mallet, pounding flour mixture into meat. Brown meat in a large skillet of hot oil. Remove all oil. Add tomatoes, onion, celery, carrot and thyme. Bring to a boil, then reduce heat. Cover and simmer for 1–2 hours, until meat is tender. (Or place in covered casserole dish and bake for 1 hour at 350° F.) Serve with rice or noodles. Makes 4 servings.





## **Green Bean Stir-Fry**

### **Sauce**

2 teaspoons cornstarch  
⅓ cup beef broth  
1 tablespoon soy sauce  
1 tablespoon sherry  
1 teaspoon cider vinegar

### **Stir-fry ingredients**

1 tablespoon oil  
1 pound green beans, trimmed and sliced diagonally  
2 teaspoons finely minced fresh ginger  
2 cloves garlic, minced  
¼ teaspoon hot red pepper flakes  
½ pound ground venison or steak sliced for stir-fry

Mix together all of the sauce ingredients and set aside. Heat the oil in a wok or large skillet and add the green beans. Stir-fry beans for about 4 minutes or until tender. Remove and set beans aside. Add the ginger and garlic to the pan and cook them lightly. Add the pepper and venison, crumbling the venison with a fork or spatula. Stir-fry until meat is done, then add sauce mix. Cook and stir until sauce thickens. Fold in the green beans and heat for 1 minute. Serve with rice or noodles. Serves 4.

## **Venison Stroganoff**

1 pound venison sirloin steak  
1 8-ounce carton sour cream  
2 tablespoons flour  
½ cup water  
2 teaspoons beef bouillon  
½ teaspoon salt  
¼ teaspoon pepper  
2 tablespoons margarine or butter  
1½ cups sliced mushrooms  
½ cup chopped onion  
1 clove garlic  
Hot cooked noodles

Partially freeze venison and slice across the grain into bite-size strips. Stir together sour cream and flour. Stir in water, bouillon, salt and pepper. Set aside. In a large skillet, cook and stir the meat in hot butter until done. Remove from skillet. Add mushrooms, onion and garlic. Cook and stir until done. Mix meat and

vegetables together. Stir flour mixture into skillet. Cook and stir until thick and bubbly. Serve over noodles.

Serves 4.

## **Happy Camper Venison**

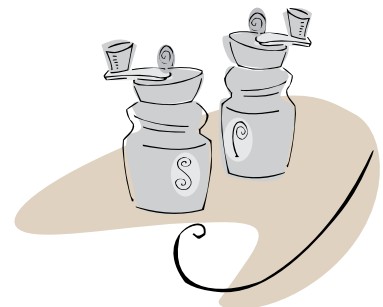
1 pound ground venison or 4 small chops  
4 tablespoons butter  
4 potatoes, peeled and sliced  
2 medium onions, cleaned and quartered  
4 carrots, sliced  
Seasoning salt  
Salt and pepper  
Honey

Form ground venison into 4 burgers or separate chops. Tear off four sheets of heavy aluminum foil for grilling. Place burger in center of foil and cover with sections of onion and a pat of butter. Lay slices of carrot and potato atop onion. Sprinkle with salt, pepper and seasoning as you layer vegetables. Drizzle with honey. Seal foil packet and repeat for other three meat patties. Place on grill or hot coals and cook for about 1 hour. Check for doneness. Serves 4.

## **Canned Venison**

Vension, cut into cubes  
Salt  
Beef soup bone  
Water  
Quart jars  
Lids and seals

Brown cubed pieces of vension in water in a soup pot. Add a beef soup bone to give the broth some fat. Fill quart-jars with vension within 1-inch of lid. Add 1 teaspoon salt (½ teaspoon for pint-jars.) Fill jar with enough broth to just cover meat. Pressure-cook according to your cooker manufacturer's recommendations or for 90 minutes at 10 pounds.



Hunter Observation Record								
Date	Hours Spent Hunting	County	Deer Stand Location	Number of Deer Seen				Notes
				Does	Fawns	Bucks	Unknown	
	A.M.							
	P.M.							
	A.M.							
	P.M.							
	A.M.							
	P.M.							
	A.M.							
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	P.M.							

# Deer Harvest Record Form

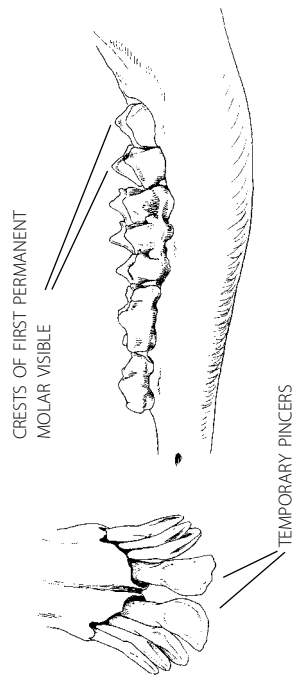
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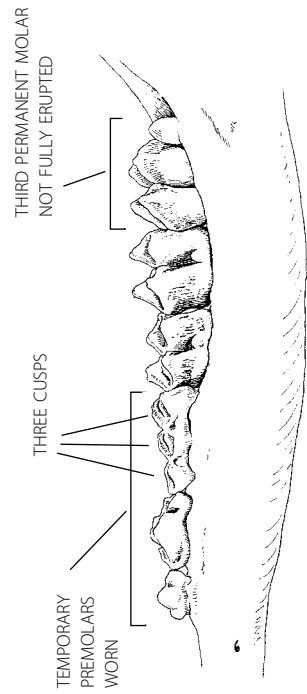


# Dental-Age Characters of White-tailed Deer

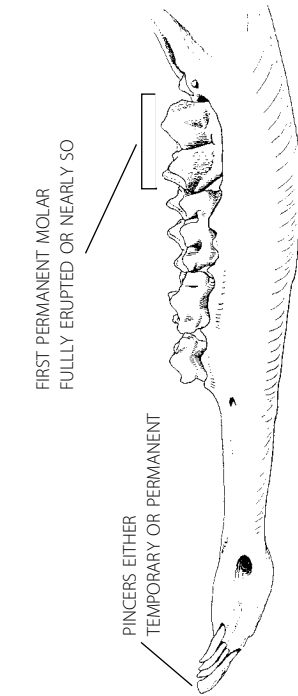
(Cheek side of lower molar tooth row)



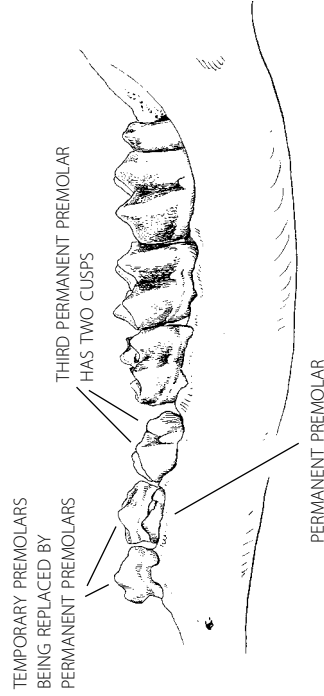
2½ to 4 months



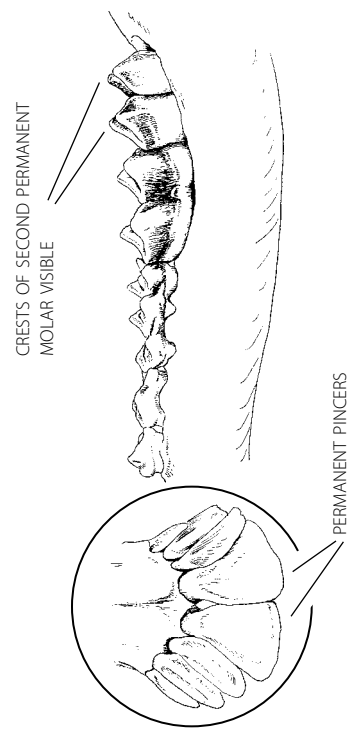
17 months



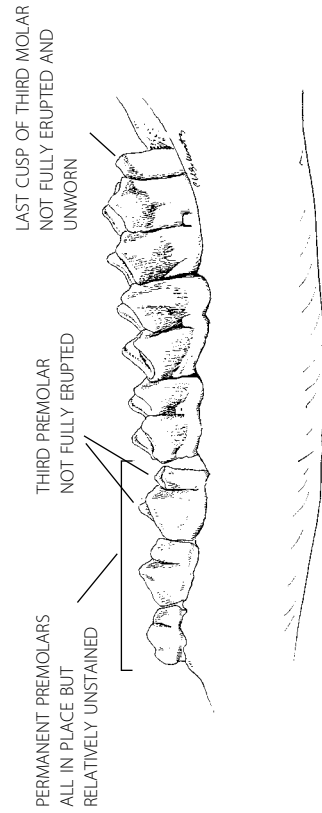
4 to 7 months



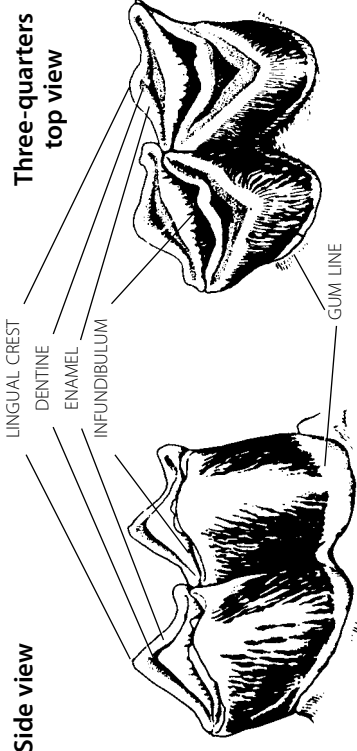
18 months



7 to 9 months

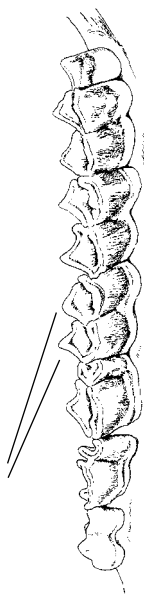


19 months



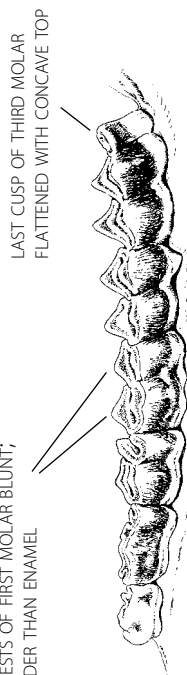
## General anatomy of lower molar

LINGUAL CRESTS OF FIRST MOLAR SHARP;  
ENAMEL WELL ABOVE NARROW DENTINE



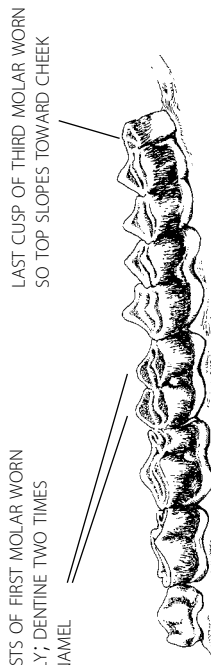
2½ years

LINGUAL CRESTS OF FIRST MOLAR BLUNT;  
DENTINE WIDER THAN ENAMEL

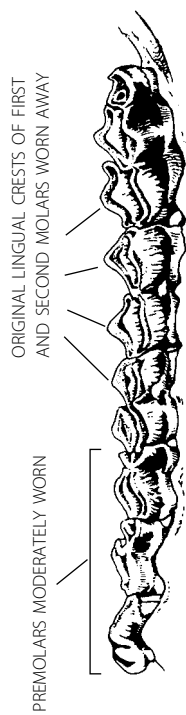


3½ years

LINGUAL CRESTS OF FIRST MOLAR WORN  
CONSIDERABLY; DENTINE TWO TIMES  
WIDTH OF ENAMEL



4½ years



5½ years

INFUNDIBULUM NEARLY WORN AWAY  
ON FIRST MOLAR; NO LINGUAL CREST

PREMOLARS HEAVILY WORN



6½ years

PREMOLARS HEAVILY WORN

INFUNDIBULUM WORN AWAY  
ON FIRST MOLAR



7½ years

INFUNDIBULUM WORN AWAY  
ON FIRST MOLAR



8½ to 9½ years



*Serving nature and you*

*Equal opportunity to participate in and benefit from programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, national origin, sex, age or disability. Questions should be directed to the Department of Conservation, P.O. Box 180, Jefferson City, MO 65102, (573) 751-4115 (voice) or 800-735-2966 (TTY), or to the U.S. Fish and Wildlife Service Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, VA 22203.*